

CLAIMS

1. A laminated fluid transfer hose construction having improved barrier properties and improved durability, which comprises:

- 5 (a) a heat and chemically resistant inner tube;
- (b) at least one metal barrier layer bonded to an outer surface of the inner tube;
- (c) at least one fluoropolymer tie-layer bonded to an outer surface of the metal layer(s); and
- 10 (d) at least one reinforcing layer bonded to an outer surface of the fluoropolymer tie-layer(s).

2. The laminated fluid transfer hose construction of claim 1, wherein the heat and chemically resistant inner tube is prepared from a material selected from the group of fluorocarbon polymers, polyamides, polyethylene resins, polyesters, 15 polyimides, polypropylene, polyvinylchloride, silicones, and mixtures thereof.

3. The laminated fluid transfer hose construction of claim 2, wherein the heat and chemically resistant inner tube is prepared from a fluorocarbon polymer selected from the group of polytetrafluoroethylene, copolymers of tetrafluoroethylene and hexafluoropropylene, perfluoroalkoxy resins, polymers of ethylene-20 tetrafluoroethylene, and mixtures thereof.

4. The laminated fluid transfer hose construction of claim 1, wherein the at least one metal barrier layer is prepared from a metal selected from the group of aluminum, stainless steel, nickel, copper, brass, chrome, and corrosion-resistant alloys.

25 5. The laminated fluid transfer hose construction of claim 4, wherein the at least one metal barrier layer is a single-layer metal structure.

6. The laminated fluid transfer hose construction of claim 5, wherein the single-layer metal structure comprises a chromate conversion coated aluminum single-layer metal structure.

30 7. The laminated fluid transfer hose construction of claim 4, wherein the at least one metal barrier layer is a multi-layered structure.

8. The laminated fluid transfer hose construction of claim 7, wherein the multi-layered structure is a laminated structure comprising a chromate conversion

coated stainless steel layer located between two chromate conversion coated aluminum layers.

9. The laminated fluid transfer hose construction of claim 1, wherein the at least one fluoropolymer tie-layer is prepared from a fluoropolymer material 5 selected from the group of polytetrafluoroethylene, copolymers of tetrafluoroethylene and hexafluoropropylene, perfluoroalkoxy resins and polymers of ethylene-tetrafluoroethylene.

10. The laminated fluid transfer hose construction of claim 9, wherein the fluoropolymer material is a perfluoroalkoxy resin.

10 11. The laminated fluid transfer hose construction of claim 10, wherein the average peel strength between the at least one metal barrier layer and the at least one reinforcing layer is at least about 0.40 kilogram per centimeter.

15 12. The laminated fluid transfer hose construction of claim 11, wherein the average peel strength between the at least one metal barrier layer and the at least one reinforcing layer is at least about 0.50 kilogram per centimeter.

13. The laminated fluid transfer hose construction of claim 1, wherein the at least one reinforcing layer is prepared from glass fibers.

14. The laminated fluid transfer hose construction of claim 1, wherein the at least one reinforcing layer is prepared from aramid yarns or fibers.

20 15. The laminated fluid transfer hose construction of claim 1, which further comprises an outer sleeve or jacket.

16. A laminated fluid transfer hose construction, which comprises:

25 (a) an inner tube formed by wrapping a fluoropolymer film, in an overlapping fashion, along a portion or length of a cylindrical mandrel, wherein the fluoropolymer film is substantially uniformly sealed to itself in overlapping regions along the length of the hose;

(b) an aluminum barrier layer; and

(c) a fluoropolymer tie-layer,

30 wherein, the aluminum barrier layer and the fluoropolymer tie-layer are formed by wrapping a fluoropolymer clad aluminum tape along a portion or length of the inner tube, wherein the fluoropolymer clad aluminum tape is substantially uniformly sealed to itself in overlapping regions and to inner tube along the length of the hose; and

5 (d) a fiberglass reinforcing layer, wherein the fiberglass reinforcing layer is formed by wrapping a fiberglass tape, in an overlapping fashion, along a portion or length of the fluoropolymer tie-layer, wherein the fiberglass tape is substantially uniformly sealed to itself in overlapping regions and to the fluoropolymer tie-layer along the length of the hose.

17. The laminated fluid transfer hose construction of claim 16, wherein the fluoropolymer of the fluoropolymer tie-layer is a perfluoroalkoxy resin.

18. A hose assembly having improved barrier properties and improved durability, which comprises:

10 (a) a laminated fluid transfer hose construction, which comprises:

1. a heat and chemically resistant inner tube;
2. at least one metal barrier layer bonded to an outer surface of the inner tube;
3. at least one fluoropolymer tie-layer bonded to an outer surface of the metal layer(s); and
4. at least one reinforcing layer bonded to an outer surface of the fluoropolymer tie-layer(s); and

15 (b) coupling means.

19. The hose assembly of claim 18, wherein the fluoropolymer of the fluoropolymer tie-layer is a perfluoroalkoxy resin.

20 20. A hose assembly having improved barrier properties and improved durability, which comprises:

25 (a) a laminated fluid transfer hose construction, which comprises:

1. an inner tube formed by wrapping a fluoropolymer film, in an overlapping fashion, along a portion or length of a cylindrical mandrel, wherein the fluoropolymer film is substantially uniformly sealed to itself in overlapping regions along the length of the hose;
2. an aluminum barrier layer; and
3. a fluoropolymer tie-layer,

30 wherein, the aluminum barrier layer and the fluoropolymer tie-layer are formed by wrapping a fluoropolymer clad aluminum tape along a portion or length of the inner tube, wherein the fluoropolymer

clad aluminum tape is substantially uniformly sealed to itself in overlapping regions and to inner tube along the length of the hose; and

4. a fiberglass reinforcing layer, wherein the fiberglass reinforcing layer is formed by wrapping a fiberglass tape, in an overlapping fashion, along a portion or length of the fluoropolymer tie-layer, wherein the fiberglass tape is substantially uniformly sealed to itself in overlapping regions and to the fluoropolymer tie-layer along the length of the hose; and

5 (b) coupling means.

10 21. The hose assembly of claim 20, wherein the fluoropolymer of the fluoropolymer tie-layer is a perfluoroalkoxy resin.